An Accompt of ſome Books.

I. *The ANATOMY of VEGETABLES begun; with a General accompt of VEGETATION, founded thereon: by* Nehemiah Grew *M.D. Fellow of the* Royal Society, 1671. *in* 12°.

THe Ingenious and Learned Author of this Book conſidering with himſelf, that the *Anatomy* of *Vegetables* hath hitherto been much uncultivated, and that yet it very well deſerved the labours of diligent Naturaliſts, hath here attempted to make a very particular Inquiry into the Conſtitution and Structure of Plants, and thereupon to found a rational Diſcourſe concerning the Nature of Vegetation. Which being undertaken by him, he advertiſeth thoſe that ſhall think fit to examine theſe Obſervations of his, not only, that they begin, and ſo proceed till they end again, with the *Seed*; but alſo, that they confine not their Inquiries to one time of the Year, but to make them in ſeveral Seaſons, wherein the Parts of a *Vegetable* may be ſeen in their ſeveral Eſtates: And then, that they neglect not the *Comparative* Anatomy, confronting ſeveral Vegetables and their ſeveral parts together.

The Method he chuſeth in the proſecution of this ſubject, is the Method of Nature her ſelf, in her continued *Series* of Vegetations, proceeding from the *Seed* ſown, to the formation of the *Root*, *Trunk*, *Branch*, *Leaf*, *Flower*, *Fruit*; and laſtly, of the *Seed to be ſown again*, or in its ſtate of Generation.

Diſcourſing of the *Seed* as Vegetating, he diſſects a *Garden-Bean*, and ſhews the two *Coats* thereof; the *Foramen* in the outer *Coat*; and what is generally obſervable of the *Covers* of the Seed. This done, he diſplays the proper Seed it ſelf, and therein finds three conſtituent and as 'twere Organical parts of the Bean, *viz.* the Main Body, always divided into two Lobes (though in ſome few other ſeeds into more;) and two other appendant to the *baſis* of the Bean; whereof the *one* is called by him the *Radicle*, being that, which, upon the vegetation of the Seed, becomes the *Root*; the *other*, the *Plume*, which becoms the *Trunk* of the Plant; and being divided at its looſe

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looſe end into divers pieces, (all very cloſe ſet together as *Feathers* in a bunch) theſe pieces are ſo many true and already form'd, though not diſplayed, ***Leaves***, intended for the ſaid Trunk, and foulded up in the ſame plicature, wherein, upon the Bean's ſprouting, they do appear. Theſe Organical parts he finds compoſed of theſe Similar ones, *viz.* 1. the *Cuticle*, extending it ſelf over the whole Bean, and herein diſtinguiſht from the *Coats*, that whereas *theſe*, upon ſetting the Bean, do only adminiſter the ſap, and then die; the *Cuticle* is with the Organical parts of the Bean nouriſh't, augmented, and coextended. 2. The *Parenchyma* it ſelf, having ſome ſimilitude to the pith, while ſappy, in the roots and trunks of plants; common *to*, and the ſame *in*, the Lobes, Radicle and Plume of the Bean. 3. The *Inner Body*, diſtributed throughout the *parenchyma*, but withall eſſentially different from it; called by the Author the *Seminal Root*, and diſtinguiſh't from the *Radicle*, in that the former is the Original root within its ſeed, the latter is the Plant-root, which the *Radicle* becoms in its growth; the *parenchyma* of the ſeed being, in ſome reſemblance, that to the *Seminal root* at firſt, which the *mould* is to the *Plant-root* afterwards; and the *Seminal root* being that to the *Plant-root*, which the *Plant-root* is to the Trunk. Having viewed theſe parts, he inquireth into their *Uſe*, and in what manner they are the Fountain of Vegetation, and concurrent to the Being of the future Plant.

Proceeding to the *Root*, (which he finds ſubſtantially one with the *Radicle*, as are the Parts of an Old man with thoſe of a *Fœtus*,) he therein obſerveth its *Skin*, *Cortical Body*, and *Lignous part*, together with the Original of each of theſe, and the *Pores* of the two latter, and their proportions; as alſo the *Pith*, and its Original, ſometimes from the *Seed*, ſometimes from the *Cortical Body*, together with its *Pores*, and Proportions: Moreover, the *Fibres* of the *Lignous* body diſperſed through the pith, and the *Cavity* and *Pith* of thoſe Fibres. Where he explains, How the Root grows, and what is the Uſe of its parts; how it grows in length and breadth; and how it deſcends; adding the Uſe of the *Pith*, *viz.* for the better advancement of the *Sap*, and its quicker and higher Fermentation, begun in the

Cortical Body, inſerted through the *Lignous part*, by which Inſertions the Sap, like the Bloud of the diſſeminations of the *Arteries*, is conveyed to its intimate parts: Our Author conjecturing, that the deſign, whereto all theſe parts are together concurrent, is the *Circulation* of the Sap.

Having thus declared the degrees of *Vegetation* in the *Root*, he next ſhews the Continuance thereof in the *Trunk*; the obſervables and parts of which are, 1. The *Skin*, derived from the *Cuticle* of the Seed: 2. The *Cortical Body*, originated from the *parenchyma* of the Seed: 3. The Lignous Body, being the Prolongation of the *Inner Body*, diſtributed in the *Lobes* and *Plume* of the Seed: 4. The *Inſertment* and *Pith*, proceeding alſo from the *Plume*, as the ſame in the *Root* from the *Radicle*; ſo that, as to their Subſtantial parts, the *Lobes* of the Seed, the *Radicle* and *Plume*, the *Root* and *Trunk*, are all one. Here notice is taken of the Shooting of the *Lignous body* in breadth; wherein are obſervable its *Fibres*, Production of *Rings*, and eſpecially *Pores*; and *theſe* of three ſorts, greater, leſſer, and leaſt of all; all continuous and prolonged by the length of the Trunk: which he proveth by an Experiment made by Mr. *Hook*, by filling up (ſuppoſe in a piece of *Char-coal*) all the ſaid Pores with *Mercury*, which appears to paſs quite through them, as is viſible by a good Glaſs. The reſult of all is, that the *Woody* part of a Vegetable is nothing elſe but a Cluſter of Innumerable and extraordinary ſmall Veſſels or concave Fibres. He farther ſhews the *Inſertions* of the *Cortical body* in the *Trunk*, and the *Pores* of thoſe Inſertions; in none of which *pores* he could obſerve any thing, that may have the true nature and uſe of *Valves*; the non-exiſtence of which he is aſſerting. He diſcourſes alſo of the *Poſition* and Tract of the Pores: and concludeth this Chapter by declaring, How the *Trunk* aſcends; How its parts, in conſequence of that Aſcent are diſpoſed; How that diſpoſition is conſequent to the different nature and energy of the *Sap*; what the effects are of that difference; which way, and how the *Sap* aſcends, *viz.* by the joynt ſubſerviency of the *Lignous* and the *Cortical Body* in ſome, but in moſt, and principally, of the *Lignous Body*, and *Pith*; the latter being here conſider'd as a Curious *Filtre* of Nature's own contrivance: where

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he examins, *How* the *Pores* of the Pith are permeable; and renders a reaſon, why a piece of *dry Elder-pith*, ſet in ſome tinged liquor, the liquor doth not then penetrate the Pores, ſo as to aſcend through the Body of the *Pith?* To this part is annexed, by way of *Appendix*, ſome Conſiderations of the *Trunk-Roots* and *Claſpers*, and the Uſe of both.

After this, he proceeds to the *Germen*, *Branch*, and *Leaf*, and finds in the two former the ſame parts with thoſe of the Trunk, *viz.* the ſame Skin, and the ſame *Cortical* and *Lignous* Bodies, as alſo the ſame *Inſertment* and *Pith*, here into propagated, and diſtinctly obſervable in it. Further, he ſhews the manner of their growth, and nutrition, and how the *Germen* is ſecured; as alſo the Uſe of the *knots*. Then he lays open the parts of a *Leaf*, and explains the Poſitions of the Fibres in the Stalks of Leaves, and the Cauſe of their different ſhape, and of their being flat. Then he diſcourſes of the *Foulds* of Leaves, their kinds and Uſe, together with the Uſes of the *Leaf* it ſelf. To this Chapter alſo he makes an *Appendix* of *Thorns*, *Hairs*, and *Globulets*, explaining both their Conſtitution and Uſe.

Next, he gives an Accompt of the *Flower*, and its three general parts, the ***Empalement***, the ***Foliation***, and the *Attire*; explaining the formation, nature, and uſes of all three, but moſt particularly of the *Attire*, which he finds to be of two kinds, *Seminy* and *Flory*; the *Seminy*, made up of two parts, *Chives* and *Semets*, the latter of which are hollow, yet not ſo but that they are filled up with minute particles, like a powder. The *Florid* Attire is commonly called *Thrumbs*, which are ſeveral *Suits*, of which this *Attire* is made up: The *outer part* of every *ſuit*, is its *Floret*, which is the Epitome of a *Flower*, and, in many Plants, all the Flower. The *next* part is from within its *Tube* brought to ſight, and is called the *Sheath*, likewiſe concave. The third part and the innermoſt of the *Suit* is the *Blade*, which is ſolid, yet at its point evermore divided into two halves; upon which diviſion there appears a *Powder* of *Globulets*, of the ſame nature with thoſe of a *Semet*. The Uſe of the *Attire* he aſſigns to be not only Ornament and Diſtinction to us, but alſo *Food* to a vaſt number of little Animals, who have their peculiar proviſions

viſions ſtored up in theſe *Attires* of Flowers; each Flower becoming their Lodging and their Dining-room, both in one: Though it cannot as yet be determined, Wherein the particular parts of the *Attire* may be more diſtinctly ſerviceable, this to one Animal, that to another; or to the ſame Animal, as a *Bee*, whether this for the *Honey*, another for their *Bread*, a third for the *Wax*; or whether all do only ſuck from hence ſome *Juice*, or ſome may not alſo carry ſome of the parts, as the *globulet*, wholly away, &c.

In the following *Chapter* he treats of the *Fruit*, conſidering the Number, Conſtitution, and Original of the Parts of an *Apple*, *Bean*, *Plum*, *Nut*, and *Berry*; and obſerving, that the general Compoſition of all Fruits is one, that is, their *Eſſential* and *Vital* parts, are in all the ſame, and but the Continuation of thoſe, which in the other parts of a Vegetable he hath already taken notice of. To which he ſubjoyns the *Uſes* of Fruits, both for *Man* and *Beaſt*, as alſo for the *Seed*; to which latter it ſerveth for ſupply of Sap, and for Protection and Security, the whole Fruit being, by comprehenſion, that to the *Seed*, what the Hen, by Incubation, is to the Egg or Chick.

In the *Laſt* Chapter he conſiders the *Seed* again, but in its ſtate of *Generation*; as he before examined it in its ſtate apt for *Vegetation*: where occurs, what in the other ſtate was either not diſtinctly exiſtent, or not ſo apparent, or not ſo intelligible. As firſt the *Caſe* of the Seed, and its *outer* Coat, their figures, various ſurface and Mucilages; together with the nature of the *outer* coat and its original: Then, the original and nature of the *inner* coat, in which the *Lignous Body* or *Seed branch* is diſcribed. Whereupon he obſerveth, that all the *Parts* of a Vegetable, the *Root*, *Trunk*, *Branch*, *Leaf*, *Flower*, *Fruit*, and *Seed*, are ſtill made up of two ſubſtantially different Bodies; and that, as every *part* hath two, ſo the *whole* Vegetable, taken together, is a Compound of two only, and no more; all properly *Woody* parts, *Strings* and *Fibres*, being one *Body*; all ſimple *Barks*, *Piths*, *Parenchyma's* and *Pulps*, and, for ſubſtance, *Pills* and *Skins* alſo, all but one Body: The ſeveral parts of a Vegetable differing from each

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other only by the various proportions and mixtures, and variouſly ſized pores of theſe two Bodies.

But to return, beſides theſe three Covers, he finds a fourth, which is the innermoſt, called by him the *Secondine*, the concave of which membrane is filled with a tranſparent liquor, out of which the *Seed* is formed. Through this membrane, the *Lignous Body* or *Seed-branches*, diſtributed in the *inner* Coat, at laſt ſhoot down-right two ſlender Fibres, like two Navils, one into each Lobe of the Bean: Theſe Fibres, from the ſuperficies of each Lobe, deſcend a little way directly down; and then preſently each is divided into two Branches, one diſtributed into the *Lobes*, the other into the *Radicle* and *Plume*.

As for the *Generation* of the *Seed*, dependent upon the Hiſtory delivered, he ſaith, that the *Sap*, having in the *Root*, *Trunk*, and *Leaves*, paſſed divers Concoctions and Separations, in the manner by him deſcribed, 'tis at laſt, in ſome good maturity, advanced towards the *Seed*. The more Copious and *Cruder* part hereof is again ſeparated by a free reception into the *Fruit*, or other part analogous to it. The more *Eſſential* part is entertained in the *Seed branches*, which being conſiderably long and very fine, the ſap becoms therein, as in the *Spermatick veſſels*, ſtill more mature. From hence it is next deliver'd up into the *Coats* of the Seed, as into a *Womb*, and the *meaner* part hereof is again diſcharged to the *outer* Coat, as aliment good enough; the *finer*, is tranſmitted to the *inner*, which being a *Parenchymous* and more ſpatious body, the *Sap* therefore is not *herein* a meer aliment, but in order to its being farther prepared by Fermentation. The *Sap* being thus prepared in the *inner* coat, as a liquor now apt to be the matter of the future *Seed Embryo*, by freſh ſupplies is thence diſcharged, or filtred, or tranſpired through the *Secondine* abovementioned; and the depoſiture thereof, anſwerable to the *Colliquamentum* in an Egg, or to the *Semen muliebre*, is at laſt made into the Concave of the ſame. The other part of the *pureſt ſap*, imboſom'd in the *ramulets* of the *Seed branch*, runs a Circle, and ſo becoms, as the *Semen maſculinum*, yet more elaborate. With this pureſt Sap the ſaid *ramulets* being ſupplied, from thence at laſt the *Navel-fibres* ſhoot (as the Artery into the *Colliquamentum*) through the *Secondine* into the aforeſaid liquor, depoſited therein. Into which liquor being now ſhot, and its own proper Sap or tinctures mixt therewith, it ſtrikes it thus into a *Coagulum*, or into a Body conſiſtent and truly *parenchymous*. And in the interim of the *Coagulation*, a gentle *fermentation* being alſo made, the ſaid *Parenchyma* or *Coagulum* becoms ſuch, not of any Conſtitution indifferently, but is raiſed (as we ſee Bread in baking) into a *Congeries* of *fixed Bubles*; the *parenchyma* of the whole Seed being ſuch.

The whole is illuſtrated by ſeveral *Figures*, and theſe explicated with great care.

II. *Diſſertations ſur la Nature du FROID & du CHAUD; par le Sieur* Petit, *Conſeiller du Roy, Intendant des Fortifications, &c. Avec un Diſcours ſur la Conſtruction & l'Uſage d'un* Cylindre Arithmetique, *inventé par le meſme Autheur. A.* Paris, 1671.

THe famous Author of theſe two Tracts, examins in the former, *Firſt*, the Nature, Subject, Cauſe, and Effects of Cold. As to its *Nature*, he eſteems it to be a *Poſitive* thing, and not a meer *Privation*, the Effects of *it* being as ſenſible to us, as thoſe of *Heat*. For the *Subject* of it, he placeth the Supreme Cold in the Pure *Air*, and maketh the Heat, that is ſometimes in the Air, meerly adventitious, produced in it by the Sun, but the Cold natural to the ſame. Concerning the *Cauſe* of this Cold in the Air, he will not acknowledge it to be *Nitre*, (all ſorts of Salt being by him eſteem'd hot) much leſs an Univerſal Spirit, or any Stars; but eſteems, that the Air is the *Primum Frigidum* by nature; the ſame Cauſe, that hath made it Air, having made it Cold. The *Effects* of Cold being too obvious to diſcourſe of them in print, he enlarges upon the *Manner* of its operation, performed by the inſinuation of the Air into the pores of Bodies, and increaſed by the force of Northerly winds ; where he notes, that the Cold Air, by its parts, figur'd for the purpoſe, and penetrating ſuch bodies as are diſpoſed to glaciation, divides the parts of the ſame, and arreſts their motion. Here he endeavours to prove, that Frozen water is not properly condenſed, though it be hardned and fixed, but that 'tis rather dilated by the ingreſs of the Cold Air ; whence he obſerveth that Ice is really lighter than Water.

Secondly, he diſcourſeth of *Fire*, after he hath diſcarded it from being one of the common Four Elements, and diſlodged it from its reputed place above the Air under the Concave of the Moon : And affirms, that 'tis the Heat of the Sun, which moves, quickens, and coagulates the three families of Mixts, Animals, Vegetables and Minerals, yet withall taking in a Subterraneous heat for the production of Minerals.

In the *Latter* Tract of this Book, the Author explains an Invention of his, of an *Arithmetical Cylinder*. For, finding that in the *Rabdology* of the Noble *Nepper*, the multitude and embaraſment of thoſe ſticks, filled with numbers on all ſides, proved longſom and tedious, and that thereupon the practiſe of the Invention had ceaſed ; he conſider'd of a way to render it more expedit and eaſie, and at length concluded, to take bands of paſt-board inſtead of ſticks ; on which having written the ſelf-ſame *Multiples* from 1 to 9, and made the ſame diſtribution of the numbers into little ſquares, ſeparated by a diagonal, drawn from the left to the right hand upwards, (as thoſe Sticks are ;) he added thereto a *file* of *Roman* Numbers, I, II, III, IV, V, VI, VII, VIII, IX, to be put on the ſide, and over againſt the Multiplying and Dividing Numbers ; very uſeful as well for marking the beginning and end of the ſaid numbers, to ſtop where 'tis needful (all the bands not being uſed in all operations,) as for marking the *Multiple*, which you ſhall uſe in each number. As, (*e.g.*) to multiply 7 by 5 or by 9, inſtead of being at the trouble of counting the ranks of theſe *Multiples* 5 and 9, they may be preſently ſeen in one or other of the *Files* of thoſe Roman Numbers. Having then employed theſe bands in raiſing or abaſing them on a table, to make thoſe principal numbers, that are neceſſary, to appear over againſt one another, he further bethought himſelf (for a yet ſhorter way,) to diſpoſe thoſe pieces into circles very equal, and to glew, upon each of them, 3 or 4 ſmall buttons of wood, of the bigneſs of a pins-head, and then to put them upon a *Cylinder* of wood or paſt-board, on which they might be turned by means of thoſe buttons: Which form made him call this little Inſtrument an *Arithmetical Cylinder*, which is of the bigneſs or diameter of a Childrens-Drum, or of the form of an Hat, and of what height you will, to hold as many bands or circles as you ſhall deſire to make great Operations.

The practiſe of this Inſtrument is ſhewed by divers Examples, as may be ſeen in the Book it ſelf.

III. *La* DIOPTRIQUE OCULAIRE, *par le Pere* Cherubin *d'* Orleans, *Capucin. A* Paris, 1671. *in Fol.*

THe Author of this large and elegant Volume, having propoſed to himſelf to comprehend in it and to teach all that concerns the Theory, Uſe, and Mechaniſm of the Teleſcope (by him called the *Ocular Dioptrique*,) divides it into three principal Parts.

The *Firſt* contains the Doctrine of Opticks and Dioptricks, or, of Simple viſion Direct, and that which is made by rays Refracted; both by him pretended to be handled with a ſuccinct, but ſingular, Method.

Diſcourſing of *Refraction*, he declares, That the Refraction of a viſual ray in Glaſſe to 30 degrees of inclination, is proportional to the Inclination of the ray, as far as ſenſe is able to judge of it. And that, the Inclination not exceeding 30 degrees, the Angle of the refraction of the ray, which enters into Glaſs, is about a third part of the Angle of the Inclination of the ray paſſing into the Air: But that the ſame Inclination not exceeding 30 degrees, the Angle of the refraction of the ray iſſuing out of the Glaſs into the Air, is about the half of the Angle of its Inclination in the Glaſs.

Examining, what the Diſſection of an Eye may conduce to the knowledge of the Refractions of its Humors, he noteth, That the Extinction of the vital ſpirits in a dead Animal doth extreamly alter the conſiſtence of the Humors of his Eye, which contributed much to the perfect viſion in the living animal: And that all the Experiments, that can be made by diſſecting of Eyes, to come to the knowledge of the Refractions of the Humors, and of the other parts that conduced to Viſion, cannot give the true knowledge thereof; Experience proving, that the Chriſtallin and Vitreous humors do reciproqually change their conſiſtence.

He obſerveth alſo, that not only the different Diaphaneities of the Humors of the Eye do contribute to the refraction of the viſual rays paſſing thorow them; but alſo the Figures of their Surfaces, on which thoſe rays fall unequally inclin'd. He noteth likewiſe, that the viſual rays, having penetrated the Corneous tunique and the Aqueous humor of the Eye, do not ſuffer any great refractions upon the *Anterior* ſurface of the Chryſtallin, though it be finer than the Aqueous humor; becauſe that its Spherical convexity is con-centrique to that of the *Cornea* and of the *Aqueous humor*, which are likewiſe ſpherical: But that they receive their greateſt refractions, when they paſs through the *Poſterior* ſurface of the Chryſtallin, which is oppoſite to them, and of a very ſmall Sphere, and upon which they are found much inclined.

He taketh further notice, That the ſurfaces of the Chryſtallin humor are not Hyperbolical but perfectly Spherical; and that the exactneſs, which by that means is pretended for Viſion, is contrary to Experience, by which he aſſerts it to be undeniable, that, though by Glaſſes of an hyperbolical

cal figure,the rays, coming from the principal point of the object to the Eye, would more exactly meet in *one* point at the bottom of the *Retina*, and conſequently, that from one certain point of a determinate diſtance you would more perfectly ſee that point ; yet would not ſuch a figure reunite the rays of the other lateral points of the object, each exactly in a point of concourſe in the ſaid *retina*. So that, if the viſible object were nothing but a point, and the ſurfaces of the Chryſtallin hyperbolical,(which they are not,) there would then be made a more exquiſite viſion of that *only* point.

The *Second* part delivers the *Theory* of the Teleſcope in all its kinds : which is uſher'd in by a Hiſtory of the Invention and Antiquity of Teleſcopes ; and by a Diſcourſe concerning the Difference of the Ancient Glaſſes from the Modern.

This done, he explains the matter of this ſecond Part in XI. Sections.

1. Shews the power, which diaphanous *medium's*, leſs ſubtile then Air, and of figures ſimply Spherical, have in refracting the viſual rays paſſing thorow them.

2. Declares the Effects of Spherical Convex Glaſſes, to ſerve for the conſtruction of the Teleſcope of the *firſt kind*, which always ſuppoſeth the Eye between the Glaſs, and its point of Concourſe.

3. Conſiders the Affections of Spherical Concaves,to ſerve for the conſtruction of the ſame kind of Teleſcope.

4. Demonſtrates the Effects of the Conjunction of Spherical Convexes and Concaves,in the Conſtruction of the ſame ſort of Teleſcope.

5. Examins the Affections of Spherical Convexes, in the Conſtruction of a Teleſcope of the *ſecond* kind ; wherein the Eye is always more diſtant from the Convex Objective Glaſs, than its point of Concourſe, and which admits no Concave.

6. Shews the Effects of the Compoſition or Multiplication of Spherical Convexes,in the conſtruction of all ſorts of Teleſcopes of the *ſecond* ſort.

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7. Demonſtrates, that the long Teleſcopes, which ſerve to ſee remote objects, may alſo ſerve to ſee near objects that are ſmall.

8. Demonſtrates the Conſtruction of Microſcopes, to ſee the ſmalleſt Objects.

9. Shews the Conſtruction of a kind of Mixt or Catadioptrique Teleſcope, compoſed of Refraction and Reflection.

10. Shews, that one may ſee at one and the ſame time, with both Eyes, one and the ſame Object, by a Teleſcope; and how to make ſuch an one.

11. Treateth of the Proportion of the reſpective Convexities and Concavities of Glaſſes, to ſerve for the conſtruction of a Teleſcope.

The *Third* part of this Volume is ſubdivided into two, which the Author calls the *Poſitive*, and *Mechanical*. The *Poſitive* teacheth the actual Conſtruction of Teleſcopes, and their Uſes, and that in 12 Sections.

1. Delivers the manner of proportioning poſitively the Power of Glaſſes for Teleſcopes; together with the choice of their figure, though ſpherical, and the tryal and graduation of their goodneſs.

2. Teaches how to work actually all ſorts of Teleſcopes, and how to uſe them.

3. Teaches the manner, actually to put into uſe the Catadioptrique Teleſcope, which redreſs the object by Reflection, that before had been inverted by Refraction.

4. Shews the way of making a double Teleſcope in all its kinds, to make Objects to be ſeen by both Eyes at the ſame time, much greater and much clearer, than with one Eye alone.

5. Teaches in general, how to make actually all ſorts of Microſcopes, to ſee diſtinctly and to magnifie very conſiderably the ſmalleſt objects.

6. Treats of the Uſe of the Teleſcope generally in all its kinds.

7. Teaches a New and peculiar uſe of Teleſcopes, for

drawing to the life in proportion, from a great to a ſmall volume, any Terreſtrial objects, that are at a competent diſtance to be well ſeen; without a neceſſity of having any skill in drawing.

8. Contains the Uſe of the Microſcope in all its kinds; together with a way of meaſuring, how much a Microſcope magnifies the Object.

9. 10. 11. Treat of the Uſe of Teleſcopes in the Obſervations of *Celeſtial* Objects: Where the Author enumerates the many excellent Diſcoveries, that by their means have been made by modern Aſtronomers, who therefore may be ſaid,

Admoviſſe oculis diſtantia ſidera noſtris,
Ætheraque ingenio ſuppoſuiſſe ſuo.

Such as are, 1. The Conjunction of *Mercury* with the *Sun*. 2. *Venus* having her phaſes like the *Moon*. 3. The Body of the Moon appearing like an other Earth, full of Mountains and Vallies, Seas, Rocks, Iſlands, Lakes, Forreſts and vaſt Plains; as alſo the Libration of the *Moon*. 4. Spots in the Sun. 5. The Four Satellits of Jupiter. 6. A Satelles of Saturn, and Rings about the ſame. 7. Several Belts about Jupiter, and divers Spots in *Mars*, *Venus*, &c. 8. The *Milky way* nothing but an innumerable company of ſmall Stars, near to one another. 9 The finding an Eclipſe to begin and end ſooner when obſerved with the naked Eye, than when ſeen with a Teleſcope; as alſo, that it appears always leſs by a *digit*, being obſerved by the bare Eye, than it is indeed. 10. *Pleiades* conſiſting of many more Stars than *Seven*. 11. *Orion* having 80 other Stars beſides thoſe three in his *Belt*, and the ſix in his *Sword*: And the ſame having in his head 21, inſtead of the one, called the *Nebuloſa*. 12. The Obſervation of many New Stars, as in *Caſſiopæa*, in *Cete*, in *Cygno*, *Andromeda*, &c. Here the Author taketh occaſion to intimate, that the rich Blew of the Sky ſeems to be nothing elſe, but a Confuſion of the mixture of lights diffuſed by that innumerable number of Stars, diſperſed through the whole extent of that immenſe profundity of the Æthereal Region.

12. Teaches

12. Teaches a new way, of uſing a Teleſcope for drawing in proportion all the new Appearances in the Heavens; for meaſuring the Bodies of the Planets, and of the Fixt Stars themſelves and their diſtances, in ſuch parts, that a *Line* (the twelfth part of an inch) ſhall contain a 1000 of them; an inch (the twelfth part of a foot) 12000, and a foot, 144000: Beſides, a very eaſie and certain way of making all theſe parts (though very ſmall) perceptible to the bare Eye.

So far of the *firſt* Head of this *Third* Part.

The *other* Head is the *Mechanical*, ſhewing the ſeveral ways of Forming and Poliſhing all ſorts of Glaſſes, that ſerve for Teleſcopes; which is done in *ſix* Sections.

1. Rectifies the *Common* way of forming Glaſſes Spherically, and all the Moulds, in which the Vulgar Artiſts are wont to work them.

2. Teaches a way of excellently forming and poliſhing ſuch Glaſſes by hand, without any Engin.

3. Teaches a way of working Glaſſes by the hand guided by a ſimple Engin.

4. Treats of the working of Glaſſes by Inſtruments and Engins, regulating and directing the hand.

5. Teaches a New way of working Spherical Concave Eye-glaſſes, to ſerve Teleſcopes of the firſt kind, above-mentioned.

6. Teaches a New way of working all ſorts of Spherical Glaſſes, Convex and Concave, for Teleſcopes, very univerſally, ſpeedily, with eaſe, and in a ſmall room; even for the longeſt Tubes.

All which the Author concludeth with a Direction for a way of making Tubes that may ſerve to fit up Teleſcopical Glaſſes.

ERRATA.

In *Numb.* 74. p. 2221. l. 25. r. *is by Bruerus deſcribed to Muffet.*
In this *Numb.* 78. p. 3023. l. 22. r. *predicted.* for *practiſed.* p. 3029. l. 16. *& unum.* ibid. l. 25. r. *ſpectarentur.*

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